Do Electronic Mail Discussion Lists Act as Virtual Colleagues?

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Anesthesiology Discussion Group (ADG), an electronic mail (email) discussion list, has previously been shown to be a clinically oriented, cost-effective form of telemedicine.[1] ADG is composed of an international collection of anesthesia providers. Discussions with colleagues are generally informal in nature and are examples of types of information-seeking behavior which frequently occur in hallways or lounges of a hospital or clinic. Information-seeking occurs when a health care provider searches for information which will be used to solve or satisfy a patient's problem or need.

We surveyed practitioners who had previously submitted non-rhetorical, clinical questions to the group. After analysis of the questionnaire results, we conclude that ADG is a valuable resource used for information-seeking and is a clinically effective form of telemedicine. Many of the respondents indicated that they used ADG to obtain second opinions from the collective expertise of group members. Respondents also indicated that they were generally satisfied with the quality of responses and would not hesitate to use ADG for future clinical questions.

INTRODUCTION

'Telemedicine' frequently connotes two-way, real-time audiovisual communication between a patient at one location and a specialist physician at a remote location. Telemedicine can be viewed in a broader sense: the practice of medicine at a distance (*tele*) using communications technology to carry medical information between two points. Although televideo provides invaluable support for clinical decision-making in time-critical contexts, its major drawback is expense, both in initial purchase and equipment maintenance. On the other hand, email discussion groups are cost-effective because 1) access to the Internet is inexpensive, and 2) communication occurs at the convenience of both parties. In this context, 'convenience' is defined as the ease of reading and responding to email messages, not the delivery of email messages — an event that may occur at any point in time. Email discussion groups may not be responsive to clinical decision-making in time-critical events because several days can elapse from the time a question is submitted to the group and an answer has been posted.[1]

In a general sense, information is divided into *formal* and *informal* types. Formal information is found in textbooks, journals, and databases (e.g., MEDLINE) and consists of rules, laws and principles about how institutional or physiologic systems are supposed to work. On the other hand, informal information is experiential, generally not written, and consists of exceptions to formal rules and laws, thus providing examples of how institutions and physiologic systems actually work.[2]

Research has demonstrated that formal information sources, such as the corpus of medical literature, are capable of providing clear, relevant material that impacts patient care.[3] Conversely, only a small portion of the medical literature describes information related to diagnosis, treatment and prognosis of illness. Finding important and valid studies for an individual patient might be difficult for busy clinicians.[4] Early research in informal information- and advice-seeking has shown that physicians use colleagues as information resources on a regular and frequent basis and find such interactions of considerable value. This study concludes that there are specific 'opinion leaders' among colleagues who are frequently used as information resources within a medical community.[5]

Clinicians are information managers searching for patient care information, and many pieces of information are required in order to make clinical decisions. Finding, categorizing, and using that information requires nearly 25% of their time.[6]

To our knowledge, there have been no studies examining peer communication and informal information-seeking behavior among anesthesia practitioners using digital communications resources. In this study, we evaluated a one-month digest of ADG messages in order to determine whether 1) this form of telemedicine is clinically effective, 2) advice- and information-seeking occurs in this communications medium, and 3) an email discussion group acts as a surrogate, or 'virtual,' colleague.

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METHODS

This study consists of four parts: 1) content analysis of a selected digest of messages, 2) questionnaire development, 3) questionnaire administration to the selected audience, and 4) data analysis. Approval from the University of Missouri-Columbia School of Medicine Institutional Review Board was granted.

In Part 1, we selected a one-month digest of messages from ADG. One of the authors (ERW) and a trained assistant performed a content analysis of 635 consecutive messages following a previously published protocol.[1] All messages containing non-rhetorical clinical questions, which were directed to ADG as a whole, were selected for further analysis. From the selected messages, a database of practitioner names, email addresses, and question topics was constructed for later use. Because it is possible for practitioners to submit more than one question on more than one topic, we stored additional question topics in relational tables.

In Part 2, a questionnaire was designed to gather information about three subject areas: 1) demographics, 2) perceived quality of responses to the practitioner's question(s), and 3) personal satisfaction with ADG as an information resource. The questionnaire consisted of 15 questions of four question types: 1) multiple choice, 2) fill in the blank, 3) 10-point Likert scale, and 4) open-ended response questions. Four questions sought demographic information such as the length of time the practitioner had belonged ADG, type of practice (e.g., academic, private, or both), and the number of other anesthesia in the practitioner's hospital (e.g., local colleagues). Two questions asked the practitioner to rate the overall quality of responses to clinical questions in ADG. One question asked practitioners to rate the quality of responses to the practitioner's personal question(s). One open-ended question asked for the reasons that the practitioner submitted the question to ADG, and another asked the practitioner to relate the best response received. One question asked the practitioner to rate his/her likelihood of submitting clinical questions to ADG in the future. Five questions were not used to provide data for this study.

In Part 3, the questionnaire was mailed electronically to the practitioners selected in Part 1. A short introduction described the research project, the date the practitioner's question was submitted to the group, and the topic of the question(s) submitted. Delivery of the questionnaires was tracked using a return receipt function in the email software. If the questionnaire was undeliverable, a current email address was found and the questionnaire was mailed again. Follow-up mailings were sent 7 and 14 days after the first to encourage non-responders.

In Part 4, we analyzed the data gathered from the email questionnaires.

RESULTS

A content analysis was performed on 635 consecutive messages, which comprised a one-month digest of messages from ADG. After consensus conference, 70 non-rhetorical clinical questions were identified from 56 practitioners.

Twenty-eight practitioners (50%) returned questionnaires for analysis. There were 42 clinical questions presented to ADG from these practitioners. Twenty practitioners asked a single question, 5 asked 2 questions, and 3 practitioners asked 4 questions during the month studied.

Demographic Information. Eight respondents (28.6%) were new to ADG in the preceding 6 months. Ten (35.7%) had belonged between 6 and 12 months, 2 (7.1%) between 12 and 18 months, 2 (7.1%) between 18 and 24 months, and 6 (21.4%) for longer than 24 months.

Eleven practitioners (39.3%) were from academic practices, 8 (28.6%) from private practices, 7 (25%) from a combined private and academic practice, and 1 (3.6%) was a resident physician. One (3.6%) respondent did not answer this question. For the sake of group size in statistical analysis, the resident physician was added to the combined private and academic group. This decision was based on knowing the hospital and training program of the resident physician.

A majority of the respondents were from practices with many other anesthesia providers (NAP) in the hospital. Only 1 (3.6%) respondent was a solo practitioner (no practice colleagues), 1 (3.6%) had 1 colleague, 1 (3.6%) had 2 to 4 colleagues, 4 (14.3%) had 5 to 9 colleagues, and 21 (75%) had ten or more colleagues in their hospital.

Perceived Quality of Response to Questions. When asked to rate the overall quality (OQ) of ADG messages, the median response was 7.1 on a 10-point Likert scale with extremes of "Very uncomfortable" (1) and "Very comfortable" (10). (Figure 1)

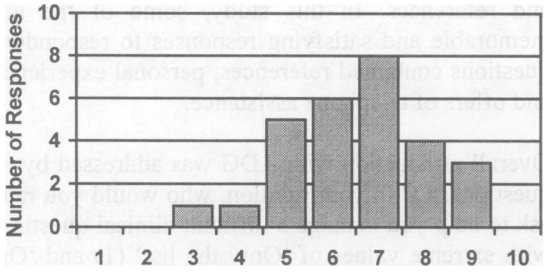

Figure 1 -- Overall Consultation Quality

Respondents were asked to rate the quality of responses to their personal question(s) (QSQ) submitted to the group. The median score was also 7.1 on a 10-point Likert scale with extreme values of "Poor" (1) and "Superb" (10). (Figure 2)

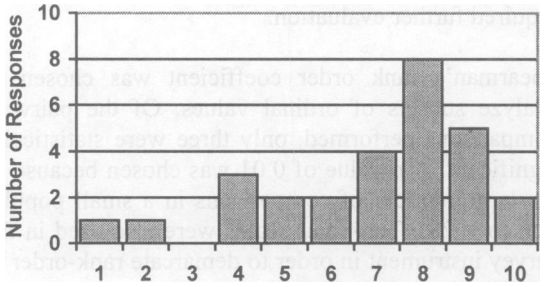

Figure 2 -- Quality of Individual Responses

Practitioners answered an open-ended question regarding their reasons for submitting clinical questions to the group. A variety of reasons were enumerated, such as: "...a controversial issue in our department...", "...was interested in the broadest experience, as I have found our anaesthetists quite parochial...", and "...wanted to know the current practice in a new area, [because] the information is unavailable in textbooks." Of the 27 (96.4%) responses to this question, 23 (85.2%) generally expressed the desire to benefit from the experience among members of the group. Four (18.8%) stated that they knew of no other formal information source providing an answer for the question.

Overall satisfaction. Practitioners were asked to indicate their choice of a consultant (WHO) when managing a difficult clinical problem. On a 10-point Likert scale with extremes of "Only the list" (1) and "Only my practice colleagues" (10), the median score was 5.9. When asked how likely the respondent would be to use ADG in the future for clinical questions (FC), the median score was 8.7, with extremes of "Never" (1) and "Without hesitation" (10). A score of 5.5 is considered a neutral response.

Pairwise Comparisons. Spearman's rank correlation was performed on five ordinal subsets: number of anesthesia providers (NAP), overall quality of ADG (OQ), quality for specific question(s) (QSQ), likelihood of future use (FC), and who to ask (WHO). NAP has 5 possible responses ranging from '0' to '10 or more' other providers. The other categories are ranked on a 10-point Likert scale. Extreme values were placed at each end of the Likert scale in the following manner: OQ of 'Very uncomfortable' and 'Very comfortable,' QSQ of 'Poor' and 'Superb,' FC of 'Never' and 'Without hesitation,' and WHO of 'Only the list' and 'Only my practice colleagues.' The ends of the extremes had values of 1 and 10 respectively. A five-by-five matrix was examined, with only 3 significant rank-order comparisons at the $p<0.01$ level. A partial representation of the table, including the three significant comparisons, is shown in Table 1.

Subset	FC	NAP
WHO	-0.511	N/S
WHO	N/S	0.535
OQ	N/S	-0.511

Table 1 – Spearman's rank order coefficient (rho) for subset comparisons.

DISCUSSION

The purpose of this study was to determine whether an email discussion group is a clinically effective form of telemedicine. We also analyzed, by questionnaire and content analysis, the informal information-seeking behavior in a population of anesthesia providers. Email was selected as the delivery vehicle for the questionnaire for several reasons: 1) this is the method of communication for ADG, 2) email surveys are inexpensive compared to telephone, postal mail, or in-person surveys,[7] and 3) the return receipt functionality of electronic mail software allowed us to determine that the survey was received by the practitioner.

A sample of convenience (n=56 anesthesia practitioners) from a randomly selected one-month digest met criteria for inclusion in this study. Of that sample, 28 (50%) participated by returning an email questionnaire. These 28 respondents asked 42 clinical questions during the one-month study period. Analysis of demographic information revealed that 18 (64.3%) of the respondents had belonged to ADG for a year or less, however the distribution of questions from this

subgroup was not significantly different than any other subgroup based on length of membership ($p<0.01$).

Eighteen (64.3%) of the respondents were associated with academic anesthesia departments. This proportion is consistent with our previous findings that academic practitioners comprise a majority (57.7%) of frequent contributors to ADG.[1] Although we cannot clearly identify a practitioner profile, we suggest three possible reasons for this pattern: 1) academic practitioners commonly have easy access to the Internet, especially email, 2) patients requiring complex clinical management skills are more common in tertiary care hospitals, and 3) academic practitioners are more willing to share their expertise in an international audience of their peers.

Respondents were asked to rate the overall quality of responses to clinical questions presented to the list. The median response was 7.1 and a relatively uniform distribution is noted (Figure 1). Although the same median value occurs when respondents were asked to rate the responses to the personal questions they submitted, the distribution is clearly skewed to the left (Figure 2). In fact, several respondents rated responses to their particular question(s) as 'Poor.' The question rating overall quality was designed to validate the results of the question rating the quality of responses to the practitioner's personal question(s), therefore, it was surprising to see the disparity of responses and the skewed distribution of Figure 2. We can only surmise that the respondents had greater expectations for their personal questions than for the overall quality and were disappointed when they reviewed the responses received for their personal questions.

Although questions can be submitted to discussion groups for many reasons, most of the respondents to this questionnaire wanted to obtain international and diverse opinions from other peers in their profession. Some respondents used ADG to ask about techniques or complications that have not been described in textbooks or journals (e.g., anesthetic techniques for neuroendoscopy). This suggests that some ADG members are on the cutting edge of anesthetic technology. It further suggests that this communications medium brings these practices to public knowledge in a more timely manner than textbooks or journals.

During a formal patient consultation with a specialist clinician, the specialist frequently summarizes the medical problem, discusses management options, and provides education about the disease process. Sometimes the specialist supplies the requesting practitioner with further information, such as journal citations and references. In this study, some of the most memorable and satisfying responses to respondents' questions contained references, personal experiences, and offers of telephone assistance.

Overall satisfaction with ADG was addressed by two questions: 1) "In your opinion, who would you rather ask to help you manage a difficult clinical question?" with extreme values of 'Only the list' (1) and 'Only my practice colleagues' (10), and 2) "Would you use the list in the future for clinical consultation?" with extreme values of 'Never' (1) and 'Without hesitation' (10). The first question received a median score of 5.9, just above the neutral value of 5.5, while the second received a median score of 8.7. Clearly, these practitioners will use ADG in the future. However, the disparity between future use of ADG and who to ask in a difficult clinical dilemma was surprising and required further evaluation.

Spearman's rank order coefficient was chosen to analyze subsets of ordinal values. Of the pairwise comparisons performed, only three were statistically significant. A p-value of 0.01 was chosen because of the large number of comparisons in a small population ($n = 28$). Ten-point scales were also used in the survey instrument in order to demarcate rank-order in a small sample population.

A statistically significant negative correlation was identified between the subsets of 1) who to ask in a difficult clinical dilemma (WHO) and 2) the likelihood of using ADG for future consultation (FC). That is to say, respondents who would use ADG 'without hesitation' in the future were more likely to ask ADG for consultation rather than 'my practice colleagues' when faced with a difficult clinical question. In addition, a significant positive correlation was noted for respondents who preferred to use ADG (WHO) and the number of anesthesia practitioners at the local hospital (NAP). Hence, those practitioners who preferentially use ADG to ask difficult clinical questions had fewer practice colleagues at their local hospital. This strongly suggests that practitioners in a solo or small group practice use ADG as a surrogate, or 'virtual,' colleague. Finally, a significant negative correlation was noted between overall quality ratings (OQ) and number of anesthesia practitioners (NAP). Respondents who were located in large practices tended to rate the overall quality of ADG lower than those who had fewer local colleagues.

Because the numbers of responses in each cell of the correlation table were small, cells were combined and

correlation coefficients recalculated. There was no loss of statistical significance in the recalculated coefficients.

Our interpretation of the results of this study is subject to several limitations. This is a content analysis of a small proportion of the membership from ADG. It is not a random sample and the sample size is small, therefore it may not be generalizable to a larger body of practitioners. Also, the digest of messages was three months old at the time the questionnaire was mailed. Some of the respondents commented that their answers for some of the questions might be influenced by passage of time. We elected to let the practitioners judge the quality of responses to clinical questions. We feel this approach is justified because the practitioner ultimately determines the value and authenticity of patient care information obtained by consultation. By using a questionnaire, we sought to reduce observer bias and increase the validity of representing the practitioners' satisfaction with the responses they received to their question(s).

CONCLUSION

Hallway or coffee room conversations among clinicians are clinically useful and valued as sources of information. The physicians' lounge and coffee rooms frequently serve as meeting places for discussions about patient care information. Such gatherings are informal in nature and are frequently group discussions rather than personal or private conversations. Such discussions often include clinical information and can act as a 'think-aloud' opportunity for reviewing thoughts and actions about particularly vexing clinical problems.

In the same manner, email discussion groups are informal and generally occur between members of a peer group, bound together by common interests. In the case of ADG, all members of ADG have some interest in the field of anesthesiology. Like physical discussion groups, individuals choose to participate in an email discussion by a conscious action with predictable group dynamics. There are those who rarely 'speak,' and those who dominate conversations by active, daily participation.

Therefore, email discussion groups can be thought of in the context of virtual hallway or coffee room discussions. However, instead of a local community, one now addresses an international audience. The practitioners rated the likelihood of future use of ADG for clinical questions very high. We suspect that the neutral rating of using the list vs. practice colleagues for difficult clinical problems resulted from the preponderance of academic clinicians represented in the demographics of the discussion list. The rank correlation clearly demonstrates that clinicians from smaller practices depend on ADG and use it as though ADG was a colleague.

In summary, we found that ADG is a clinically effective form of telemedicine. In the group studied, ADG acted as a virtual colleague, especially to practitioners from solo or small practice groups. Finally, there is evidence that informal information-seeking occurs in this peer group and that such information is highly valued.

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